Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
IKONOS Imagery for the Republic of Palau

1.2. Summary description of the data:
The National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service (NOS) is tasked with the coral mapping element of the U.S. Coral Reef Task Force (CRTF) under the authority of Executive Order 13089. NOS is responsible for coral reef mapping in Puerto Rico, the U.S. Virgin Islands, the Northwest Hawaiian Islands, the Main Eight Hawaiian Islands, and the U.S. Territories and Freely Associated States of the Pacific. Space Imaging, Inc (SI) and Analytical Laboratories of Hawaii, LLC (ALH) has produced GIS-compatible benthic habitat digital maps of the Republic of Palau using the classification scheme defined by NOAA. The map products produced through this project include baseline data of U.S. coral reefs, location of coral reef boundaries and overall coral reef cover, and the geomorphologic structure in and around coral reef systems. Maps include the 9 major and 23 detailed biological cover types, 4 major and 14 detailed geomorphological structure types, and 15 mutually exclusive zones specified in NOAA's hierarchical classification manual for coastal waters of the Republic of Palau. Benthic habitats are delineated from the coastline to water depths of 30 meters in GIS using manual interpretation techniques. NOAA utilizes IKONOS Multispectral (MSI) Satellite Imagery from Space Imaging, Inc., consisting of both newly acquired and archived imagery. The imagery consists of 1m panchromatic and 4m MSI with a horizontal accuracy of at least 5m CE95 at 1:4,800 National Map Accuracy Standard (NMAS). Once the imagery is processed, NOAA will use ALH's hand-digitize GIS approach to produce the benthic habitat maps at a minimum mapping unit of one acre, as well as NOAA's preferred random stratified accuracy assessment method.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2003 to 2006

1.5. Actual or planned geographic coverage of the data:

W: 134.091263, E: 134.752, N: 8.218, S: 6.8537

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
raster digital data

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NCCOS Scientific Data Coordinator

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
NCCOS.data@noaa.gov

2.5. Phone number:

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
NCCOS Scientific Data Coordinator

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):

Process Steps:

- 2007-01-01 00:00:00 - All of the IKONOS imagery was purchased in National Imagery Transmission Format (NITF) with the associated Rational Polynomial Coefficients (RPCs or satellite ephemeris data). Raw satellite images were converted from Digital Numbers (DNs) to normalized reflectance. As part of the conversion from DNs to at-satellite reflectance, the following equation is used (Green et al. 2000) :$R = pi * L/ (Eo \cos(theta0)\ 1/r2)$ L = radiance (from calibration provided by Space Imaging). r = earth-sun distance in Astronomical Units. theta0 = the solar zenith angle. Eo = the mean solar exo-atmospheric irradiance in each band. (A convolution of the spectral response and solar radiation from Neckel and Labs (1984) was used to get Eo.) The acquisition angles (ephemeris data) of the satellite relative to the ground at the time of image acquisition were also used. Calibration coefficients for the satellite, provided by Space Imaging, were used to calculate at-satellite radiance, which was then transformed to reflectance. The normalized reflectance imagery was then transformed into water reflectance (or the signal less than 10 cm above the water surface). Water reflectance uses the near-infrared band to remove radiance attributed to atmospheric and surface effects (Stumpf et al. 2003). Water reflectance estimates how the signal (photons) received by the satellite is diminished as it passes through the atmosphere on the way down to the water-atmosphere boundary and on the way back up to the satellite after the signal leaves the water-atmosphere boundary. Water reflectance also estimates how the signal at the satellite is diminished by water vapor, clouds, specular effects at the water surface (wave surface glint), and other signal- absorbing and diffusing materials.Georeferencing/mosaicking of the imagery was performed using PCI OrthoEngine module. The NITF IKONOS imagery was orthorectified using the Rational Functions extracted from the NITF, then further supplemented with ground control collected via survey grade GPS and corrected for terrain displacement using the DEM's where available. When multiple scenes were available for a given area, these were collectively incorporated into the orthomosaic project through bundle adjustment. Each scene was exported as a separate orthorectified file for further image processing. In addition, the best segments of each scene were selected for creation of the final mosaic. Segments of each scene were selected to minimize sun glint, cloud interference, turbidity, etc. in the final mosaic. Where possible, parts of images obscured by sun glint or clouds

were replaced with cloud/glint free parts of overlapping images. As a result, most mosaics have few or no clouds or sun glint obscuring bottom features. However, in some cases, clouds, sun glint, or turbid areas could not be replaced with overlapping imagery. In these areas, such obstructions were minimized but could not be eliminated completely.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
No

6.1.1. If metadata are non-existent or non-compliant, please explain:
Missing/invalid information:
- 1.7. Data collection method(s)
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.2. Name of organization of facility providing data access
- 7.2.1. If data hosting service is needed, please indicate
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
   https://www.fisheries.noaa.gov/inport/item/39062

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
   Metadata produced and maintained in accordance with the NOAA Data Documentation
   Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-
   Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

   7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

   7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

   7.2.1. If data hosting service is needed, please indicate:

   7.2.2. URL of data access service, if known:
      http://ccma.nos.noaa.gov/products/biogeography/palau/data

7.3. Data access methods or services offered:

7.4. Approximate delay between data collection and dissemination:

   7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
National Centers for Coastal Ocean Science - Silver Spring, MD

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions
Line and Staff Offices may extend this template by inserting additional questions in this section.